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**INTERFACE DEVICE AND DISPLAY SYSTEM**  
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3 Claims

## ABSTRACT OF THE DISCLOSURE

This invention relates to an interface device including a transparent, flexible member which is coated with a suitable transparent, electrically conductive layer, and a transparent base member which has been coated with a layer of a resistive material. The flexible and base members are supported in a spaced relationship so that when pressure is applied to the flexible member it will be placed into contact with a particular portion of the layer of resistive material. Sets of diodes may be connected to the layer of resistive material and a source of alternating potential may be connected to the sets of diodes to successively direct currents along the X, Y coordinates of the layer of resistive material. When the flexible layer is brought into contact with the layer of resistive material, a signal is derived from the conductive layer which is indicative of the X, Y position of the point of contact. Such an interface device may be incorporated into a display system in which signals indicative of the X, Y coordinates of the point of contact may be used to control the image which is seen through the interface device.

## BACKGROUND OF THE INVENTION

### Field of the invention

This invention relates to interface devices, and more particularly to those interface devices which are sensitive to pressure to indicate the point at which the pressure is applied.

### Description of the prior art

In order to impress a bit of information upon a student, it is desirable to correlate a physical movement of the student with the information being perceived by the student. In the present art, computers are adapted to store great quantities of educational materials which are presented to the student at the command of the computer. In turn, the computer is programmed to respond to the answer of the student. Therefore, simple interface devices are needed which communicate between a human and the storage computer. A particularly useful device for programmed instruction is a two dimensional array of points arranged in an X, Y coordinate system, which the student may activate manually. When a student applies pressure to a point in this array, the interface device should transmit to a computer logic signal which indicates which of the points was selected by the student.

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Further, it is desirable to design the interface device so that the desired educational information may be displayed through or upon the interface device which the student activates by touching. Thus, in an educational system, discrete bits of educational information would be displayed upon the interface device. After a series of facts has been presented to the student, the student is asked a question and required to respond to the information by touching a portion of the interface device. The interface device should then be able to give a signal indicating the portion of the interface device which the student pressed. In turn, a computer circuit is adapted to evaluate the response of the student and to control the presentation of a new series of information bits. If the student responded correctly upon the interface device, a new set or series of informational bits will be presented to the student. On the other hand, if the student responds incorrectly, remedial instruction will be presented to the student.

At present, an interface device as described in the copending application Ser. No. 585,007 entitled "Display Screen and Switching Matrix," by H. A. Wagner has been used as an interface device in a teaching system as described above. The display screen, switching matrix as described in the above-identified copending application includes a plastic plate with square depressions milled therein. The square depressions correspond to the active areas or points of the switching array. Electrically conductive members such as wires are stretched across the depressions in both the X and Y directions. The wires are placed under tension and are disposed within the depressions so that the X direction wires do not normally contact the Y direction wires. A flexible layer with a matt surface on one side is disposed across the X and Y sets of wires so that when a portion of the flexible layer is pressed, the wires disposed beneath that point of the flexible layer will be brought into contact with each other.

It is an object of this invention to provide a new and improved interface device in which the pattern of conductive elements do not interfere with the presentation of information through the interface device. Further, it is desirable to provide an interface device with greater resolution than can be achieved by the use of discrete electrically conductive members.

## SUMMARY OF THE INVENTION

These and other objects are accomplished in accordance with the teachings of the present invention by providing a new and improved interface device including a first base member which is transparent to radiation and has a surface layer of a resistive material that is likewise transparent to radiation. The interface device further includes a second, flexible layer having a transparent surface layer of an electrically conductive material. The flexible layer is disposed above and spaced from the layer of resistive material so that when a portion of the flexible layer is pressed, the layer of electrically conductive material and the layer of resistive material are brought into contact with each other. Further, several sets of diodes are connected to the layer of resistive material, and an alternating potential source is applied between these sets of diodes to alternatively